COURSE SYLLABUS

PRINCIPLES OF VIROLOGY (JBL 304)

Course credit: 3-1-0

Molecular Biology and Genetics Unit

January- May 2024

Time: Monday: 11am-12.30pm, Tuesday: 2-3:30pm

Location: SBS Conference Room

Primary instructor: Dr. Shwetha Shivaprasad
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Course Overview:

Welcome to the "Principles of Virology" course! This course is intended for masters and graduate students who are interested in exploring the field of virology. It will include an overview of existing and emerging viruses, their replication strategies, immune evasion mechanisms, interactions with diverse hosts, pathogenesis and challenges in the development of vaccines and antiviral therapies. The course will also discuss basic and high-throughput systems biology methods used to probe the viral life cycle and discover novel druggable virus-host interactions such as viral growth and titration assays, mutational analyses, genetic and proteomic screens with specific emphasis on the fundamental principles defining each technique. The course explores the past, present and future of Virology while promoting problem-solving and critical thinking skills through discussion of journal articles.

Learning goals:

By the end of the course,

1. Students will be able to explain the translation and replication strategies used by diverse viruses to establish infection in their hosts.
2. They will be able to communicate how viruses exploit host cellular machineries and evade host immune response mechanisms to establish infection.
3. They will be able to explain fundamental concepts underlying commonly used techniques in the field of virology and identify instances where these techniques have been applied to answer research questions in journal articles.
4. Students will be able to relate their learning to real-world challenges in the development of antiviral interventions.

Course material:

1.Principles of Virology – Jane Flint, Vincent Racaniello, Glenn Rall, Theodora Hatziioannou and Anna Marie Skalka

2. Fields Virology - Peter Howley, David Knipe and Lynn Enquist

	Content
Week 1	Introduction to Virology Importance, Discovery of viruses, defining properties, Virus Evolution and classification
Week 2	Techniques in Virology
Week 3	Viral entry and tropism Attachment, uncoating, intracellular trafficking and nuclear import
Week 4	Viral replication mechanisms Synthesis of RNA from RNA and DNA templates
Week 5	Viral translation mechanisms and host translation regulation
Week 6	Mechanisms of genome assembly and packaging
	Mid-term exam
Week 7	Virus-host interactions
Week 8	Viral immune evasion mechanisms Barriers to infection- innate and adaptive immune responses
Week 9	Virus evolution and emerging viruses
Week 10	Vaccine development
Week 11	Antiviral therapies
Week 12	Final Exam